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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/524,770	02/15/2005	Kazuyuki Mikubo	Q86329	3434

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EXAMINER	
DATSKOVSKIY, MICHAIL V	
ART UNIT	**PAPER NUMBER**
2835	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	02/16/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)	
	10/524,770	MIKUBO ET AL.	
	Examiner	Art Unit	
	Michael V. Datskovskiy	2835	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *15 February 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-35* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-6,20-24 and 31-35* is/are rejected.

7)☒ Claim(s) *7-19 and 25-30* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *15 February 2005* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. The previous non-final rejection action erroneously was directed to the wrong (non-amended) set of claims non-preliminary amended set of claims. Therefore, the previous office action is withdrawn.

Drawings

2. Figure 1 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). Corrected drawings in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 1, 4, 24 and 31-32 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

5. Claim 24 is rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential structural cooperative relationships of elements, such omission amounting to a gap between the necessary structural connections. See

MPEP § 2172.01. The omitted structural cooperative relationships are: Claim 24 depends on claim 20, which is a child claim of the claim 1, which claims a liquid pump disposed on a surface of the base, while according to the claim 24 said liquid pump is built in into the cooling unit, which is contradictive.

6. With respect to claim 1: It is not clear how a cooling liquid flow path described in the specification as a liquid flow path 10 is claimed in the claim 1 as a first flow path and a second flow path. It is inherent that as long as it is a closed liquid cooling loop as it is described in the specification there is only one cooling liquid flow path, unless it is specifically claimed as a first part of a flow path located in a first part of the device and a second part of a flow path located in a second part of the device. Altogether it is not clear how beside a pump located on a top of a base or embedded inside said base structures claims by claims 1 and 2 are different from each other.

7. With respect to claim 4: It is not clear what applicant meant in the claim. The expression: "...an air cooling unit is disposed an air cooling fin croup for exhausting heats which is diffused by the liquid cooling unit in atmosphere" does not make much sense. It looks that instead/next to of the underlined "an" there should be another word: possibly: "inside" or "integrally within" or "on the top".

8. With respect to claims 31, 32: It is not clear why to supply air to a liquid pump by a fan, and how it results in circulating the coolant by said pump.

Double Patenting

9. Applicant is advised that should claim 31 be found allowable, claim 32 will be objected to under 37 CFR 1.75 as being a complete duplicate thereof. When two claims

in an application are duplicates or else are so close in content that they both cover the same thing, despite a slight difference in wording, it is proper after allowing one claim to object to the other as being a substantial duplicate of the allowed claim. See MPEP § 706.03(k).

Claim Rejections - 35 USC § 102

10. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

11. Claims 2, 6, 20 and 31, 32 and 35 are rejected under 35 U.S.C. 102(b) as being anticipated by Batchelder (US Patent 6,019,165) .

Batchelder teaches a cooling apparatus for cooling a heat generator in electronic devices mounted on an heat generating electronic device 10, Fig. 2, said cooling apparatus comprises: a liquid cooling unit 20 discharging heat generated by the heat generator 4 with a coolant 50; and an air cooling unit having four cooling fin groups 28 for exhausting heat discharged by the liquid cooling unit 20 in atmosphere, wherein the air cooling unit is stacked onto the liquid cooling unit 20. Batchelder teaches furthermore said cooling apparatus according to claim 1, wherein the liquid cooling unit comprises: a heat absorption surface 24 absorbing heat by one of method of contacting and joining with the heat generator; a flow path 60, in which the coolant 50 flows, formed along the heat absorption surface 24; and a liquid cooling pump 54 embedded in a base 22 for circulating the coolant within the flow path 60, wherein the air cooling unit comprises an

air cooling fan 30 for flowing air to the air cooling fin groups 28. Batchelder teaches furthermore said cooling apparatus according to claim 2, wherein the flow path is a closed loop with a circulation method, and in a part of the closed loop, a micro channel structure 52 having a smaller cross section area than a cross section area of the flow path 60 is formed. Claims 1, 3, 20, 21, 33 and 34 are rejected under 35 U.S.C. 102(b) as being anticipated by Reichard (US Patent 5,316,077).

Reichard teaches a cooling apparatus for cooling a heat generator in electronic devices comprises: first flow paths 44 in which a coolant flows, embedded in a base 16; a liquid cooling pump 136 disposed on a surface of the base 16 for circulating the coolant; a liquid cooling unit having second flow paths 112 embedded in the base 16 for connecting the first flow path and the liquid cooling pump 136: and an air cooling unit member 30 disposed on the base16, wherein the flow paths are formed by joining a base 20 having a plurality of small grooves 94-106 and the heat absorption surface 18. Reichard teaches furthermore said cooling apparatus, wherein the flow path is a closed loop with a circulation method, and in a part of the closed loop, a micro channel structure 96-104 having a smaller cross section area than a cross section area of the flow path is formed.

> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

12. Claims 1, 2, 3, 4, 20, 21, 33-35 are rejected under 35 U.S.C. 102(e) as being anticipated by Nelson et al (US Patent 6,529,377).

Nelson et al teach a cooling apparatus, Figs. 1-6, for cooling a heat generator 440 in electronic devices comprises: a first flow path 315 in which a coolant flows, embedded in a base 305; a liquid cooling pump 345 disposed on a surface of the base 305 or embedded into the base 305 (see Fig. 5) for circulating the coolant; a liquid cooling unit having second flow paths 320 embedded in the base 305 for connecting the first flow path and the liquid cooling pump 345: and an air cooling unit member 350 disposed on the base 305, wherein the flow paths are formed by joining a base 630B having a plurality of small grooves and the heat absorption surface 610B. Nelson et al teach furthermore said cooling apparatus, wherein the flow path is a closed loop with a circulation method, and in a part of the closed loop, a micro channel structure having a smaller cross section area than a cross section area of the flow path is formed.

Claim Rejections - 35 USC § 103

13. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

14. Claims 31, 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Batchelder.

16. Batchelder teaches all the limitations of the claims except an electric control circuit driving the liquid cooling pump and the air-cooling fan, wherein, an input to the electric control circuit is DC current. It would been obvious to one having ordinary skill in the art at the time invention was made to employ an electric control circuit driving the

liquid cooling pump and the air-cooling fan, wherein, an input to the electric control circuit is DC current in the device by Batchelder, since it is well known in the art to employ DC current to control heat dissipating fans and liquid pumps used to cool miniaturized electronic devices.

17. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Nelson et al in view of Davis et al (US Patent 6,062,302).

Nelson et al teach all the limitations of the claim except the flow path is formed within at least one of fin among a plurality of fins composing the air cooling group. Davis et al teach a heat sink 20, Figs. 4-6, comprising a group of a plurality of cooling fins, wherein a cooling liquid flow path is formed within each of said fins. It would have been obvious to one having ordinary skill in the art at the time invention was made to employ an air-cooling unit comprising a flow path formed within at least one of fin among a plurality of fins composing the air-cooling group, as it is disclosed by Davis et al in the device by Nelson et al, in order to enhance a heat dissipation.

18. Claims 22-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nelson et al in view of Igarashi (US Patent Application Publication 2003/0039097A1).

Nelson et al teach all the limitations of the claim, including a check valve of plate vane structure 360A, 360B for controlling a flow direction of the coolant, except said liquid cooling pump is a piezoelectric pump. (Nelson et al also suggest different kinds of liquid pumps (col. 5, lines 35-48)). Igarashi teaches an electronic system comprising a liquid cooling system, wherein a liquid cooling pump is a piezoelectric pump 4. It would have been obvious to one having ordinary skill in the art at the time invention was made to

employ a piezoelectric pump, as it is Igarashi in the device by Nelson et al, in order to miniaturize the device.

Allowable Subject Matter

19. Claims 7-19, 25-30 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

20. The following is a statement of reasons for the indication of allowable subject matter: Claim 7: A cooling apparatus according to claim 6, wherein the air cooling unit comprises a first air channel totally covering the air cooling fin group, and an air flow generated by the air cooling fan is controlled by the first air channel. Claim 8: A cooling apparatus according to claim 1, wherein at least one air hole for supplying air to the air cooling unit is formed in the liquid cooling unit. Claims 9-14: A cooling apparatus according to claim 1, wherein the air cooling fin group is divided into a plurality of groups, and an air hole supplying air to the air cooling fin group is formed in each plurality of groups of the air cooling fin group in the liquid cooling unit.

Claims 15-19: A cooling apparatus according to claim 1, wherein the air cooling unit comprises: a piezoelectric material supported by a support member; and an air blow plate, which is bonded to the piezoelectric material, generating air flow through vibration thereof by controlling voltage of the piezoelectric materials. Claims 25-27: A cooling apparatus according to claim 22, wherein the liquid cooling unit comprises a plurality of piezoelectric pumps and a plurality of piezoelectric pump driving members for driving the plurality of pumps. Claim 28: A cooling apparatus according to claim 1, wherein the

liquid cooling unit comprises a piezoelectric pump having a toric piezoelectric actuator as a driving source, and the coolant is circulated by the piezoelectric pump. Claims 29-30: A cooling apparatus according to claim 1, wherein the liquid cooling unit comprises an evaporation-method pump circulating the coolant with evaporation of the coolant by a heat generator.

21. The prior art made of record provided in the PTO Form 892 and not relied upon is considered pertinent to applicant's disclosure. Examiner points out that each of the prior art reference is applicable for the rejection of the at least claims 1 and 33 of the instant application.

22. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael V. Datskovskiy whose telephone number is (571) 272-2040. The examiner can normally be reached on 9-5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Darren Schuberg can be reached on (571) 272-2044. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Michael V Datskovskiy
Primary Examiner
Art Unit 2835

02/05/2007